Continuous Intention to Use Mobile Banking Apps: Empirical Study in Iraq

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SUMMARY

Mobile banking on applications is increasingly becoming an effective channel in the development of banking services. The increase in smartphone penetration globally and customers spending more time on business applications raise questions for bank managers on how to entice customers to continue using mobile banking applications. This study examines factors influencing the continuous intention to use mobile banking applications by combining, the technology acceptance model TAM model and trust factor. Research indicates that perceived usefulness and trust directly influence continuous intention to use mobile banking apps, while perceived ease-of-use and perceived risk indirectly influence continuance *intention to use mobile banking apps through the trust factor. the moderating effect of demographics factors found that higher age will negatively affect the relationship between trust and* continuous *intention to use mobile banking apps.*

Keywords: Technology acceptance model (TAM); Mobile banking; Iraq

Journal of Economic Literature (JEL) codes: O10; G20; G29

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INTRODUCTION

Consumer demand for Internet banking solutions has risen in recent years (Ezzi 2014), banks have endeavoured to facilitate bank transfers and to provide a measure of safety to deliver these services to customers through the latest means and methods. The development in the provision of financial services over the internet and smartphones led to a drop in the demand for old traditional methods in developed countries (Murinde et al.).

Mobile banking applications on smartphones have become a necessary and integral banking channel that empower clients to carry out monetary exchanges such as balance inquiries, financial transactions, paying loan instalments utilising smartphones, tablets, or other personal digital assistants (Alalwan et al. 2016). The penetration of smartphones and wearable devices plays a critical role in banking services that will less depend on traditional banking and allow clients to be able to conduct their financial transactions anytime and anywhere (Mullan et al. 2017). According to one source of mobile banking statistics, about three quarters of the UK population use mobile devices to manage their finances (Perić 2022). Especially during the period of the Covid-19 pandemic, people

tend to spend more time using mobile devices and mobile applications (Santamaria, et al. 2020).

Most studies in field of mobile banking adoption have only focused on the behaviour intention to adopt mobile banking services (Phan 2020). However, there is much less information about which factors influence the customers' behaviour in the post-adoption stage of mobile banking services. Studies on continuous behaviour in using information systems are as important as the initial use, and even more beneficial in terms of cost to acquire new customers (Bhattacherjee 2001). Understanding customer's behaviour toward continuous usage of a technology was always of interest to researchers and industry, and several studies have been presented in this topic, some of which adopt the technology acceptance model (TAM) expectation-confirmation model, and others used different models.

Susanto et al. (2016) extended the expectation-confirmation model (ECM) to investigate the determinants of continuance intention to use banking services on smartphones. The study revealed that user satisfaction, perceived usefulness and self-efficacy have a significant impact on continuance intention to use services. The study highlighted the role of trust in customer relationships and suggests

that customers have more concerns about security and privacy when using mobile banking services on smartphones. In a study on a mobile fintech payment services in Korea, Lim et al. (2018) combined the expectation-confirmation model with additional factors such as fintech knowledge and perceived security and found that among studied variables only perceived usefulness PU and satisfaction have a direct influence on continious intention to use. A study conducted by Albashrawi & Motiwalla (2019) found that perceived usefulness and perceived ease-of-use had significantly positive impacts on the satisfaction of mobile banking customers, and that satisfaction would influence the continued usage of mobile banking services. This study also highlighted that only perceived ease-of-use and personalization directly impact on continued usage of mobile banking.

However, these findings of these previous studies are not consistent and need more evidence. Moreover, most previously published studies are limited to developed countries with strong IT capabilities. Therefore, there is a lack of research in developing countries such as Iraq; there is still a knowledge gap that needs to be narrowed. To achieve this purpose, this study investigates the proposed model based on TAM theory and the factor of trust. The objective of this paper is to evaluate the integrated TAM model and trust in continuous intention to use MB in Iraq. Firstly, this study begins with a brief introduction to mobile banking. In the second section, a literature review about the continuous intention to use MB and the proposed model is provided. The third section is concerned with the methodology used for this study and the fourth section presents the main findings. The last three sections include discussion, contributions, limitations, and conclusion.

LITERATURE REVIEW

Continuous intention to use mobile banking

Mobile banking adoption has been conducted by many previous studies. By applying the established theories such as the technology acceptance model (TAM), the unified theory of acceptance and use of technology (UTAUT), the Task-Technology Fit (TTF), The theory of planned behavior TPB, factors found to be influencing the intended use of mobile banking have been explored in several studies. So far, however, there has been little discussion about which factors influence the decision to continue using MB applications. Recently, some researchers have suggested using the expectation-confirmation theory and extended post-acceptance model to provide a comprehensive understanding of which factors affect the decision to continue using mobile services (Al-Emran et al. 2020; Lim et al. 2018;

Susanto et al. 2016). The ECM model is built on expectation-confirmation theory (ECT) (Oliver 1980), which is further refined using auxiliary theories and empirical findings from prior information systems (IS) use research. To explain IS use behaviour in the post-acceptance context, Bhattacherjee (2001) developed the ECT and concluded that perceived usefulness and confirmation are the most important factors influencing users' satisfaction in using IS. Thus, satisfaction directly impacts the continuance of the intention to use. Susanto et al. (2016) extended the expectation-confirmation model (ECM) to investigate the determinants of continuous intention to use banking services on smartphones. The study revealed that user satisfaction, perceived usefulness and self-efficacy have a significant impact on continuous intention to use. The study highlighted the role of trust in customer relationships and suggests that customers would have more concern about security and privacy when using mobile banking services on smartphones.

Technology acceptance model (TAM)is the most-used model in the study of the adoption of new technology. In the TAM model, it was agreed that continuous usage covaries with the acceptance for the use of new technology (Davis et al. 1989). Some previous studies have confirmed the impact of factors in TAM affecting continuous decisions. In TAM there are two factors perceived usefulness PU and perceived ease of use PEOU. Although the effect of PU on the decision to use both pre-adoption and post-adoption stage is consistent, the concern about the impact of PEOU might be removed from those of experienced users in using new technology (Karahanna et al. 1999). In the context of the current fast-changing digital era, however, firms often upgrade their information systems and update new features into applications, so it is suggested by (Sarkam & Jamil, 2022) that perceived ease-of-use would influence the decision to continue using one mobile application. Recently, in a study on the continued use of mobile learning technology, Al-Emran et al. (2020) found that PEOU has a direct impact on users' decision to continue using it. The TAM theory provides a useful account of how to explain the behaviour of customers toward IT innovations (Albashrawi & Motiwalla 2017). A few studies have begun to extend the TAM model to explain the post-adoption behaviour stage. Al-Emran et al. (2020) combined TAM, TPB, and ECM to explain the continued use of mobile learning in the United Arab Emirates.

Trust is considered to be the most important factor when explaining mobile banking adoption (Kim et al. 2009). Conducting a financial transaction on mobile financial service involving value and intangibility that are often riskier and more uncertain so building customers' trust is more important to the success of mobile services (Kim et al. 2009). Many

previous studies have identified the impact of trust on mobile banking services (Hanafizadeh et al. 2014). It must be said that the category of trust previously mentioned is often quite broad and the notion of trust is also different. According to Hanafizadeh et al. (2014), the trust of customers in planning to use mobile banking has three parts: trust in the service provider bank, trust in the cell-phone producer, and trust in telecommunication providers. These are also the three main players involved in the mobile banking service. Among these trusts, trust in banking service providers is the strongest indicator of trust.

For services using new technology, the initial trust of customers which refers to a kind of trust created from lack of trying or previous experiences plays a vital role (McKnight et al. 1998). This means that after a period of using MB apps, customers' trust is formed, including trusting that legal and technological structures adequately protect customers from problems on mobile banking, trusting that the mobile app is reliable, trusting that in the mobile banking app banks will maintain the same terms and commitments they made for other means of service . The evidence presented in this section suggests that a combination of TAM theory and trust can provide more important insights into explaining customers' behaviour in the post-adoption stage of mobile banking services. This paper will use the definition of "continuous intention to use mobile banking applications" suggested by Lim et al. (2018) who saw it as the phenomenon that "consumers who have the experience to use a mobile Fintech service intend to continuously use the mobile Fintech service". Table1 includes details about recent studies on continuous intention to use mobile applications

Table 1
Recent studies on continuous intention to use mobile applications

Author	Subject	Theory	R^2 (continuous intention to use mobile services)	Findings (on continuous intention to use)	Countries
Lim et al. (2018)	Mobile payment	Extended post acceptance model	0.61	PU and satisfaction significant impact on continuous intention to use mobile payment.	Korea
Al-Emran et al. (2020)	Mobile learning	TAM, ECM, TBP	0.703	PEOU, AT, PBC, SN significant impact on continuous intention to use m-learning	UAE
Jamshidi et al. (2018)	Mobile banking	Flow experiences	0.59	Flow, trust, individual mobility, brand equity positive affect continuous intention to use Mobile banking.	Iran
Albashrawi & Motiwalla (2017)	Mobile banking	TAM, privacy, personalization	0.459	PU, privacy, and satisfaction have insignificant impact on continuous usage of MB. PEOU and personalization impact directly on continuous usage of MB.	US
Yang et al. (2015)	Mobile banking	Task-Technology Fit & User Context Fit	0.523	TTF, UCF, perceived utilitarian value, perceived hedonic value have significant impact on mobile channel continuance.	China
Susanto et al. (2016)	Mobile banking	Extended expectation-confirmation model (ECM)	0.722	Satisfaction, PU, self-efficacy positively affect continuance use intention of MB. trust has no impact on continuous intention to use.	Korea

Source: AT, Attitude; ECM, extended expectation confirmation; PU, perceived usefulness; Perceive behaviour control PBC; PEOU, perceived ease of use; Subjective norms SN; TAM, technology acceptance model; TTF, task-technology fit; TPB, theory of planed behaviour

Research model and hypotheses

In our study, the TAM model and trust were expanded with a combination of a situational context: perceived risk and perceived cost. The study will assess the impact of factors of extended TAM and trust on continuous intention to use MB.Perceived ease of use (PEOU) According to TAM, PU and PEOU are the most important constructs influencing pre-adoption decision from

new technology users. Davis (1989) uses the term *perceived ease of use* to refer to the extent to which a person believes that using MB applications is effortless and uncomplicated. Previous research has established that PEOU did not directly impact behaviour intention to use mobile banking services, but did so indirectly through facilitating the relationship between PU and the intention. These findings refer to that banking users are willing to use MB services when they perceive that the ease of use or simply using them will contribute to improving their working performance and save time on conducting financial transactions (Alalwan et al. 2016; Luarn & Lin 2005; Makanyeza 2017). Drawing on the post-adoption stage, Karahanna et al. (1999) highlighted the diminishing impact of perceived ease of use when users become more familiar with an IT system. In case customers have previous experience in using banking services via telephone or the internet, the influence of PEOU will be no longer significant. However, in Iraq, it is different from other countries While in other countries internet banking has usually been introduced before mobile banking, this is not the case in Iraq, therefore, users' experience with online banking is somewhat limited. Furthermore, in a previous study on mobile learning, PEOU was found to have a direct impact on the continued use of mobile learning (Al-Emran et al. 2020). At the same time, the ease of understanding and the clarity in MB apps will reduce customers' concerns and improve confidence in the continuous use of MB. Previously, perceived ease of use has also been used to explain the trust in the mobile system (Kumar et al. 2018; Nel & Boshoff 2017).

Therefore, we hypothesise that:

H1: PEOU has a positive significant influence on PU

H2: PEOU has a positive significant influence on trust

H3: PEOU significantly influences continual intention to use MB app.

Perceived usefulness refers to the degree to which an individual believes that his or her job performance would be improved by using a particular system. Thus far, several studies have found evidence that perceived usefulness was the most influential factor impacting behaviour and intention to use/adopt mobile banking (Alalwan et al. 2016; Hanafizadeh et al. 2014; Shaikh & Karjaluoto 2014; Tran & Corner 2016). In some studies of IS continuance use, Lim et al. (2018) and Venkatesh et al. (2011) highlighted that perceived usefulness has become so important that it explains user behaviour in the post-using stage. Lim et al. (2018) suggested that service providers should be aware that customers have the continuous intention to use MB services provided that they confirm their security perceptions in terms of service, platform, network, and devices and the services that are useful

and finally, they are satisfied with the services. Susanto et al. (2016) confirmed that PU plays an important role in using mobile banking services on smartphones. Chen & Li (2017) found that perceived usefulness after adoption has a significant impact on continuous intention to use mobile payment services. Moreover, Suh & Han (2002) found that perceived usefulness has a significant impact on trust in the acceptance stage of internet banking. Likewise, Afshan & Sharif (2016), Kumar et al. (2018), and Sarkar et al (2020) hold the view that the perception of mobile service users toward usefulness has a positive correlation with trust. Similarly, in context of mobile banking services, using the TAM model, Afshan & Sharif (2016) affirmed that both PU and PEOU have a significant impact on the trust of customers.

Therefore, we hypothesise that:

H4: Perceived usefulness has a positive effect on continuous intention to use

H5: Perceived usefulness positively affects trust

H6: Perceived usefulness has a significant influence pn the relationship between PEOU and continuous intention to use MB apps.

Perceived risk refers to the degree of probability that there is a loss incurred from using innovative technology (Pavlou 2001). Because banking transactions on mobile devices have special features such as intangibility and value, customers' concerns are considered one of the key obstacles in deciding to use mobile banking applications (Hanafizadeh et al. 2014; Devaraj et al. 2002). Susanto et al. (2016) have revealed that risk, privacy, and security are the key concerns of trust. If the perceived risk of customers using the mobile banking application is greater, the trust of customers in that application would decrease, and then the intention to continue using the application in the future would decrease (Hanafizadeh et al. 2014). Sarkar et al. (2020) found that perceived risk has a significantly negative effect on trust in using mobile commerce.

Therefore, we hypothesise that:

H7: Perceived risk negatively affects trust

Perceived costs refer to the customer believing that using online banking will require some amount of money (Luarn & Lin 2005). For mobile services, the costs of using the service often negatively impact the use of that service (Wu & Wang 2005). When using mobile banking on smartphones, bank customers must pay fees such as a one-time set-up fee, maintenance fee, and service fees for some transactions on smartphones. Martin (2003) argued that the fees associated with these ITC services create barriers to using banking services for low-income people. Yu (2012) affirmed that the cost of using mobile banking services is one of the most important barriers affecting customers' behavioural intention toward using mobile banking.

Therefore, we hypothesise that:

H8: Perceived cost(PCO) negatively affects continuous intention to use MB app.

Trust has been considered as one of the most important barriers to the adoption of mobile services (Jamshidi et al. 2018). A number of studies have examined the effects of trust on intention behavior in using mobile banking (Hanafizadeh et al. 2014). However, the definitions of trust vary among studies. McKnight et al. (2002) noted that there are four constructs of trust, including disposition to trust, institution-based trust, trusting beliefs, and trusting intentions. Other researchers, however, found that three inherent building factors of trustworthiness should be taken into consideration, namely: the trustee's ability, benevolence, integrity (Luarn and Lin 2005). Therefore, the definition of trust should be based on the type of service and the relationship. In our research, trust in mobile banking refers to a customer's belief that banks would have enough capability to be trusted (Das & Teng 2001). Wang & Lin (2017) found that perceived trust has a positive influence on continual intention to use an IS. Previous research has revealed that trust is a critical factor impact on continual intention to use mobile commerce (Chong 2013). When bank customers perceive that mobile banking providers have enough abilities to assure customers' interests and performance meet customers' expectations, then customers intend to continue using mobile banking apps.

Therefore, we hypothesise that:

H9: trust positively affects continuous intention to use MB apps

H10: trust significantly influences the relationship between PU and continuous intention to use MB apps.

H11: trust significantly influences the relationship between PEOU and continuous intention to use MB apps.

H12: trust significant influence the relationship between PR and continuous intention to use MB apps.

Moderating variable: Age

In a study investigating the mobile banking adoption in Taiwan, Yu (2012) found that age has significant moderating effects between facilitating conditions and perceived self-efficacy on customers' behaviour in adopting mobile banking. Similarly, Chiu et al. (2017) and Laukkanen (2016) concluded that age has been considered as one of the most significant demographic variables in context of internet/mobile banking services. This result can be explained by the fact that older customers tend to be more resistant to using mobile banking services (Laukkanen 2007, 2016). Moreover, in a study conducted by (Laukkanen & Pasanen 2008), it was shown that the proportion of customers aged 30 to 49 was (much) larger than the younger group of customers in using mobile banking services.

Therefore, we hypothesis that:

H13: The influence of PCO on continuous intention to use MB apps will be moderated by age.

H14: The influence of PEOU on continuous intention to use MB apps will be moderated by age.

H15: The influence of perceived usefulness PU on continual intention to use MB apps will be moderated by age.

H16: The influence of trust TRU on continuous intention to use MB apps will be moderated by age.
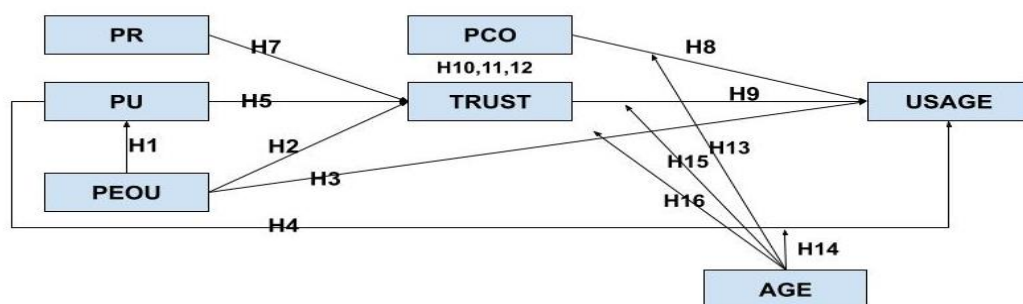
Source: own work

Figure 1. Research model

RESEARCH METHODOLOGY

An online survey questionnaire was used to collect the data. The questionnaire was distributed through social media networks and by email. A random sampling method was used. We asked the participants whether they are using mobile banking applications, then only MB application customers moved to the next stage which required to answer all the questions. As a result, after screening and removing duplicated cases or unintentional responses there were 188 valid cases for the analysis. The structure of studied questionnaire was divided

into two parts: basic demographic information and perception. The descriptive analysis shows that 60% are males while the rest are females. Manyof the respondents are aged between 20-40. Just a half of participants are employees and 11% is unemployed, while the others are students or retired. All of the respondents are smartphone users, 60% of them use mobile banking services once a month or less frequently, while 40 percent are weekly or daily users (more details from Table 2). In the second part, all participants were asked to respond using a 5-point Likert scale ranging from 1 to 5.

Table 2
Descriptive data

Category		Number of respondents	Percentage
Gender	Male	113	60%
	Female	75	40%
Age	Less than 20-year-old	16	8.5%
	20-30 years old	70	37.2%
	30-40 years old	70	37.2%
	40-50 years old	26	13.8%
	Above 50 years old	6	3.3%
Occupation	Student	54	28.7%
	Employed	110	58.5%
	Unemployed	21	11.1%
	Retired	3	1.7%
Education	High school	21	11.1%
	Diplomat	9	4.8%
	Bachelor's degree	64	34%
	Master's degree	74	39.4%
	Ph.D. Degree	20	10.7%
What kind of devices do you have?	Smartphone	188	100%
	Tablet	30	16%
	Smartwatch	9	4.8%
How often do you use mobile banking?	Daily	40	21.3%
	Weekly	32	17%
	Monthly	56	29.7%
	Less frequently	60	32%

Source: own work

RESULTS

Measurement model

The data management and analysis were performed using SmartPLS 3 (Ringle et al. 2015). A major advantage of SmartPLS 3 is that this software is useful in analysing variance-based structural equation modelling instead of a covariance-based SEM method.

For assessing the quality of the measurement model, firstly, examining construct reliability, convergent validity, and discriminant validity was performed. To begin this process, the reliability was calculated using the composite reliability, average variance extracted, and Cronbach's alpha. The value for composite reliability ranged between 0.814 and 0.889 which far exceeded the minimum level of 0.7 (Hair et al. 2013). The average variance extracted were greater than the threshold of 0.7 (Nunnally & Bernstein 1994) and the Cronbach's alpha values were also greater than the cut-off value of 0.7 (Hair et al 2014). Nevertheless, two indicators that had an outer loading below 0.70 (PR2=0.699, EE3<0.5) did not meet this minimum acceptance level. However, instead of automatically eliminating these indicators, we decided to keep PR2 based on the suggestion of Hair et al. (2011, 2014). After removing the item with low Cronbach's alpha value (EE3), all criteria

of reliability were checked again, and we found that all Cronbach's alpha values and composite reliability exceeded the minimum level of 0.7, and the average variance extracted were above the value of 0.5. Therefore, there was no reason for removal item PR2 (Hair et al. 2014). All constructs satisfied the criteria for convergent validity (Chin 1998).

For establishment of the discriminant validity, the cross-loading value of all measurement items and the square root of AVEs were checked. As shown in Table 3, all of the intercorrelations among the items were below the square root of the AVEs (Fornell & Larcker 1981). The results from assessing the measurement model indicated that the measurement model is reliable and valid.

Table 3
Outer loading, Cronbach's alpha, composite reliability, and average variance extracted

Factor	Items	Outer Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
	COST1	0.827			
	COST2	0.702			
	COST3	0.77			
Perceived Cost	COST4	0.849	0.87	0.868	0.623
	PEOU1	0.841			
Perceived ease of use	PEOU2	0.816	0.814	0.814	0.687
	PU1	0.844			
	PU 2	0.754			
	PU 3	0.851			
Perceived usefulness	PU 4	0.815	0.889	0.889	0.667
	PR1	0.797			
	PR2	0.699			
Perceived risk	PR3	0.96	0.861	0.863	0.682
	TRU1	0.824			
	TRU2	0.843			
	TRU3	0.82			
Trust	TRU4	0.732	0.881	0.881	0.65
	USAGE 1	0.769			
	USAGE 2	0.803			
	USAGE 3	0.774			
continuous intention to use	USAGE 4	0.778	0.862	0.862	0.61

Source: own work

Table 4
The correlation of latent variables

	COST	PEOU	PU	PR	Trust	USAGE
COST	**0.789**					
PEOU	0.077	**0.829**				
PU	0.004	0.702	**0.817**			
PR	0.452	-0.042	-0.049	**0.826**		
Trust	-0.281	0.411	0.473	-0.21	**0.806**	
USAGE	-0.126	0.567	0.765	0.001	0.71	**0.781**

(The square root of AVE values is shown on the diagonal and printed in bold)
Source: own work

Structural model

The partial least squared analysis was used to examine the relationship between proposed factors and continuous intention to use mobile banking applications. The tables below provide important insight into customers' behaviour. The striking result in Table 6 shows that for our data PU and trust (TRU) have a significantly positive impact on USAGE. The R^2 value of continuous intention to use (0.742), trust (0.271), and PU (0.493), as shown in Table 6, can be considered to be at moderate level (Hair et al. 2014). This is a rather significant outcome, especially considering that an R^2 level of above 0.2 would be considered high in disciplines like consumer behaviour. The criteria evaluated were the path coefficient and hypothesis testing, which shows the strength of connections between latent constructs of research model. To assess different proposed hypotheses, the bootstrapping process was performed using 5,000 bootstrap samples as recommended by Hair et al. (2014). Thus, an examination of different hypotheses was conducted, focusing on path coefficients and t-values, as well as p-values.

Results of the study shows that for our sample PU is the strongest predictor of continuous intention to use MB apps, followed by trust. The statistical tests for the collected data revealed that there was a significant positive effect of PEOU on PU ($\beta=0.702$, $\rho<0.01$), however, PEOU was shown to have an insignificant positive influence on trust ($\beta=0.152$, $\rho>0.05$) and continuous intention to use ($\beta=-0.01$, $\rho>0.05$); therefore, hypotheses H2 & H3 were rejected. As Table 6 shows, a significant positive influence of PU on both trust ($\beta=0.358$, $\rho<0.01$) and continuous intention to use MB apps ($\beta=0.559$, $\rho<0.01$) was found, which means that hypotheses H4 & H5 were accepted. Perceived risk was found to have a negative and significant influence on trust ($\beta=-0.186$, $\rho<0.05$). However, perceived cost was found to have an insignificant influence on continuous intention to use ($\beta=-0.001$, $\rho>0.05$). Therefore, hypothesis H8 was rejected. Trust has a positive and significantlinfluence on continuous intention to use MB apps ($\beta=0.45$, $\rho<0.01$). Therefore, H9 was accepted.

Using smartPLS, it is not possible to determine the overall fit statistics. Tenenhaus et al. (2014) suggest that the Goodness of Model Fit (GoF) can be more useful for calculating. It was recommended that the Global Goodness of Fit should be higher than the acceptable value of 0.36 (Chen & Sharma, 2015). Based on our results, GoF=$\sqrt{(R^2 *AVE)}$ = $\sqrt{(0.502*0.653)}$ =0.572. This technique also has been adopted by Susanto et al. (2016).

Mediating effect:
The analysis of the data shows that PEOU does not have a direct impact on continuous intention to use but has a significant indirect effect through PE. Perceived risk and perceived usefulness are also found to have a significant indirect effect on the dependent variable (continuous intention to use) through influencing trust.

Table 5
Mediating effect results

Hypothesis	Relationship	Mediator	Standardized indirect coefficient	Standard Deviation	t- value	Note
H10	PU -> USAGE	Trust	0.393**	0.088	4.463	accept
H11	PEOU -> USAGE	Trust	0.161**	0.062	2.602	accept
H12	PR -> USAGE	Trust	-0.084*	0.034	2.474	accept

(*p<0.05; **p<0.01; ***p<0.001)
Source: own work

Moderating effect:

The result from our analysis shows that the relationship between trust and continuous intention to use MB apps was moderated by age. This moderating effect is significant and negative, which means that the higher the age group, the lower the impact of trust on continuous intention to use MB apps.

Table 6
Structural model results

Relationship	path coefficient	Standard Deviation	t-value	Note
COST -> USAGE	-0.001	0.059	0.011	reject
PEOU -> PU	**0.702*****	**0.064**	**11**	**accept**
PEOU -> Trust	0.152	0.12	1.27	reject
PEOU -> USAGE	-0.01	0.108	0.093	reject
PU-> Trust	**0.358****	**0.119**	**3.004**	**accept**
PU -> USAGE	**0.559*****	**0.112**	**4.992**	**accept**
PR -> Trust	**-0.186***	**0.072**	**2.573**	**accept**
Trust -> USAGE	**0.45*****	**0.079**	**5.676**	**accept**
R^2=0.742				
Age*COST -> USAGE	0.013	0.049	0.271	reject
Age*PEOU -> USAGE	0.073	0.085	0.858	reject
Age*PU-> USAGE	0.193	0.1	1.937	reject
Age*Trust -> USAGE	**-0.222***	**0.069**	**3.212**	**accept**
Age -> USAGE	0.021	0.057	0.369	reject
R^2=0.796				

(*p<0.05; **p<0.01; ***p<0.001)
Source: own work

DISCUSSION

Little information was found in the literature on the question of what determinants impact on customers' continuous intention to use mobile banking on smartphone. This study set out with the aim of accessing the importance of TAM elements and trust on the decision to continue using mobile banking on smartphones in the context of a developing country. From the results of the partial least square model, the level of R^2 was found to be 74.2%, higher than previously reported levels. For example, in a study on continual intention to use m-learning, Al-Emran et al. (2019) found that the value of R^2 was 70.3%.

the statistical results for the collected data show that PEOU has an insignificant impact on the USAGE. This outcome is contrary to that of Al-Emran et al. (2020), who found a direct impact of PEOU on continuous intention to use mobile learning. However, this finding is in accord with other studies on mobile banking usage (Luarn & Lin 2005; Alalwan et al. 2016; Makanyeza 2017). The results cannot be generalized due to the sample size, yet the sample revealed that most of the studied customers from Iraq already had some knowledge of

using smartphone applications. Besides, the current MB apps are quite simple and do not have many complicated functions. That may be the reason to explain why PEOU has an insignificant effect on USAGE.

The result of this study indicate that perceived ease-of-use has a positive impact on the perceived usefulness. This finding seems to be consistent with other research on mobile payment and mobile banking topics (Luarn & Lin 2005; Alalwan et al. 2016; Makanyeza 2017). Even experienced customers who already have enough knowledge and skills to use mobile banking applications want the app to be easy to use in order to increase their working performance.

These results reveal that the perceived ease of use does not influence trust within the studied sample. This result is not in line with results of previous research, which found a relationship between PEOU and trust (TRU) (Kumar et al. 2018; Nel & Boshoff 2017). A possible explanation for this result may be that from the perception of the customers in this study, the ability to maintain safe transactions on mobile banking applications is not affected by how easy it is to use. This finding is unexpected and suggests that customers with high experience in using mobile applications strongly favour more complicated features to secure safe transactions.

Another important finding was that perceived usefulness has a significantly positive impact on the continuous intention to use MB apps. This finding is contrary to a study from Al-Emran et al. (2020) which suggested that PU and continuous intention have no relationship in the UEA context because of the higher expectation from customers about the performance of mobile-learning. However, this result matches those observed in most earlier studies (Lim et al. 2018; Venkatesh et al. 2011; Bhattacherjee, 2001; Chen & Li 2017). Understandably, customers select mobile banking apps to help them work efficiently and save time, since they do not need to go to branches and can do their financial transaction anywhere, anytime.

Our statistic regression reveals that perceived usefulness has a positive impact on the trust factor. This result is consistent with previous studies from Afshan & Sharif (2016), Kumar et al. (2018), and Sarkar et al. (2020). This finding implies that customers will trust MB applications provided that they have experience with the efficiency of mobile banking and understand that MB apps perform properly and securely.

The statistical results support the negative relationship between perceived risk and trust in the context of continuous intention to use mobile banking applications. This finding is in accord with recent studies from Susanto et al. (2016), Wang & Shan (2013), and Sarkar et al. (2020). MB customers are concerned about the risks of exposing their personal information or losing money in their account; they will reduce customers' perceptions that banks will ensure the safety of transactions and the safety of assets when trading on apps, thereby negatively impacting the continued use of MB apps. This finding from the study suggests to banks that they should provide a higher standard of security to gain trust from customers.

The results of this study indicate that trust has a significantly positive impact on continuous intention to use MB apps. It implies that customers perceive their MB apps as reliable; they will continue to use them in the future. The result from our moderating effect shows that the age variable can negatively influence the relationship between trust and continuous intention to use MB apps. This result implies that the impact of trust on continuous intention to use MB apps will be stronger with young customers. It is difficult to explain this result, but it might be due to young customers often having simple trading demands, a small number of transactions, and are early adopters of MB services, therefore, the lack of technical problems is rather unlikely; with a larger sample size the results might be different. The results also showed that older customers within our sample tends to demand a higher quality of service and express more doubts about MB apps. Therefore, this finding suggests that banks should concentrate more on raising the level of trust for older customers.

Our statistical results show that there is no significant relationship between perceived cost and continuous intention to use MB apps. This can be explained by the fact that most of the cost related to connection or having a smartphone are already paid for in their daily lives. They do not have to pay any costs for using MB apps except the monthly maintenance fee, which is not so high. This finding suggests to banks that if their customers in Iraq use MB for the first time, the cost will be no longer have an impact on continuously using in the future. But maybe in the future, customers will take the cost into their consideration in case of increasing competition among banks. It is important to note that the limitations of the sample size make it difficult to generalize the results of the study to the entire population, but these results remain important and must be considered.

CONTRIBUTIONS, LIMITATIONS, AND FUTURE RESEARCH SUGGESTIONS

Theoretical contribution

The combination of findings provides some support for theoretical development. In the context of the post-adoption stage of using mobile technology, the extended technology acceptance model and trust factor can provide valuable insights. This differs from previous related studies, most of which have assessed separately how trust and the TAM model influence customers' behaviour in adopting mobile banking services. This study contributes to our understanding of the continual intention to use MB apps. Furthermore, the research has provided new evidence about the relationship between TAM factors with trust. Firstly, the model shows that perceived usefulness continues to be the most significant factor in the post-adoption stage. This study also explores the relationship between perceived usefulness and continual intention to use mobile banking applications through two paths. Directly, perceived usefulness has a significant positive impact. Indirectly, the influence of perceived usefulness on continuous intention to use can be facilitated through trust. For the mediating effect, the study confirmed that the trust factor as acts as a vital mediator to influence the relationship of perceived usefulness and perceived risk on continual intention to use. Secondly, perceived ease of use seems to be critical with the early stage of IS adoption. However, when customers get acquainted with adopting smartphone applications, the impact of the ease-of-use variable on the continual intention to adopt should be neglected. Thirdly, according to the moderating effect, this study adds to the growing body of research that indicates the importance of the age variable in the research model. The impact of age on the post-adoption stage of new technology is analysed, finding that higher age leads to a lower relationship between trust and usage.

Practical implications

Mobile banking applications on smartphones in Iraq are still in the early stage of adoption, and the paper provides some valuable suggestions to bank managers to spend more efforts on developing mobile banking services and to gain more customer satisfaction and encourage clients to continue to use their services. The findings from this study may be applied to other developing countries that are still in the same stage of diffusing new technology. Another important practical implication is that banks should improve the usefulness of mobile banking by upgrading their apps with more efficient functions,

making them more convenient to save time and enhance user experiences. Great efforts are needed to ensure that banks should be committed to their responsibility for mobile banking by making their applications more reliable, using advanced technologies for data protection, as well as reducing the potential risks related to bank transactions. The challenge now in Iraq is that the level of protection does not reach the desired level. Mobile banking providers should apply more protection layers by utilising new security technology. Banks should determine their priorities for broadening the ecosystem of mobile banking, cooperating with third parties in providing more added-value services such as buying tickets, paying for rent and utilities, or online shopping on their apps. These new practical features would help customers perceive the usefulness of mobile banking applications.

Limitation of research and future suggestions

The research model provides a good explanation ability, however, the small sample of respondents is one of the main limitations of this research, as the sample size cannot be representative for the whole country. More studies using a bigger sample size are needed to generalize the determinants of continuously using mobile banking applications. Secondly, the study was conducted during the coronavirus pandemic, therefore, the perceptions of customers could have been affected by the new situation. Therefore, further research might explore the longitude impact among factors affecting customers' behaviour.

CONCLUSION

This study provides new insights into the post-adoption stage of mobile banking services. While some research has investigated the intention to adopt mobile banking services, there is still little scientific understanding of mobile banking services at the post-adoption stage. Furthermore, this is the first study exploring the determinants of continual intention to use a digital financial service in Iraq. The combination of the TAM model and Trust factor could be useful in understanding the customer's continuous acceptance and intention to use mobile banking. In the industrialization 4.0 era, mobile platforms are considered one of the efficient technologies in many industries. In banking services, mobile banking platforms are necessary, especially with smartphone penetration in many countries. In a developing country like Iraq, where mobile banking service is new, this paper makes a significant contribution to not only academic but also practical life. The research shows that mobile banking adoption for the studied sample in Iraq needs to be

more developed in terms of usefulness and trust. The integration of the TAM model and trust can provide a good understanding of the continuous usage of mobile banking in Iraq.

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